WHAT IS CLAIMED IS:

1. A composite biological device comprising a biostructure comprising at least one metabolically active biological material as an integral component thereof, wherein at least a portion of the biostructure comprises a nonporous latex-derived material.
2. The composite device of claim 1 wherein the biostructure comprises at least one layer comprising a porous latex-derived material and at least one layer comprising a nonporous latex-derived material.
3. The composite device of claim 1 wherein the nonporous material defines at least one channel or at least one well.
4. The composite device of claim 1 wherein the biostructure comprises no greater than about 75% by volume biological material.
5. The composite device of claim 4 wherein the biostructure comprises no greater than about 50% by volume biological material.
6. The composite device of claim 1 wherein the biological material comprises a procaryote, a eucaryote, an archean organism, or a combination thereof.
7. The composite device of claim 1 wherein the biological material comprises a mammalian cell, a blood cell, an avian cell, a plant cell, an insect cell, a bacteriophage, a spore, a virus, or a combination thereof.
8. The composite device of claim 1 wherein the biological material comprises a recombinant bacterial, yeast, or fungal cell.
9. The composite device of claim 8 wherein the recombinant cell is optimized for desiccation tolerance.
10. The composite device of claim 1 wherein the biostructure further comprises at least one additive selected from the group of a salt, a pigment, an adsorbent, a liquid crystal, a porosity modifier, a chelating agent, a nutrient, a surfactant, a dye, a photoreactive compound, an antibiotic, an antimicrobial, a bacteriostatic compound, an enzyme, an osmoprotectant, a biopolymer, a metal, a chemical catalyst, and a combination thereof.
11. The composite device of claim 1 wherein the biostructure further comprises a transmitter incorporated therein.

12. The composite device of claim 1 wherein the biostructure further comprises a detector incorporated therein.

13. The composite device of claim 12 wherein the detector senses a response emitted from the biological material when in contact with an analyte.

14. The composite device of claim 1 wherein the biostructure comprises a cross-linked latex-derived polymer.

15. The composite device of claim 1 wherein the biostructure is non-hydrated.

16. The composite device of claim 1 wherein the biostructure further comprises a porous latex-derived material.

17. The composite device of claim 16 wherein the porous latex-derived material comprises a mixture of latices.

18. The composite device of claim 1 further comprising a substrate on which the biostructure is disposed.

19. The composite device of claim 18 wherein the substrate comprises a membrane, a filament, or a wire.

20. The composite device of claim 18 wherein the substrate comprises a metal or a polymeric material.

21. The composite device of claim 18 wherein the substrate is an electronic device.

22. The composite device of claim 1 wherein the biostructure comprises wires or electrodes.

23. The composite device of claim 1 wherein the biostructure is no greater than about 500 microns thick.

24. The composite device of claim 1 wherein the entire device is no greater than about 500 microns thick.

25. A composite biological device comprising a 3-dimensional porous latex-derived biostructure comprising at least one metabolically active biological material incorporated therein; wherein the biostructure is disposed on a porous substrate.

26. A composite biological device comprising a 3-dimensional porous latex-derived biostructure comprising at least one metabolically active biological material incorporated therein; wherein the porous latex-

derived biostructure comprises at least two portions of different pore size.

27. A method of making a composite biological device, the method comprising depositing at least one latex in a first layer; depositing at least one latex in a second layer on the first layer to form a multilayer microstructure; depositing at least one metabolically active biological material separately or in a combination with at least one latex such that the biological material is incorporated into the microstructure; wherein at least one of the latices forms a nonporous component of the microstructure.

28. The method of 27 wherein depositing comprises ink-jet printing with an ink-jet printer.

29. The method of 28 wherein the ink-jet printer includes piezo-electric or acoustic pumps.

30. The method of claim 27 wherein the second layer is deposited in a pattern.

31. A composite biological device for determining the presence of a metal in a sample, the device comprising a biostructure comprising at least one biological material, wherein, upon contact with the metal, the biological material produces a response and emits a signal.

32. The device of claim 31 wherein the biostructure comprises biological material immobilized in one or more layers of a polymeric material.

33. The device of claim 31 wherein the biological material comprises bacterial cells.

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34. The device of claim 33 wherein the bacterial cells comprises *E. coli* cells.

35. The device of claim 31 wherein the biological material is genetically engineered to produce a response to the metal of interest.

36. The device of claim 35 wherein the biological material luminesces upon contact with the metal of interest.

37. The device of claim 36 wherein the biological material includes a metal resistant promoter and a reporter gene that encodes luciferase.

38. The device of claim 31 which is capable of detecting a metal in an inorganic or organic form.

39. The device of claim 31 which is capable of detecting mercury.

40. The device of claim 39 which is capable of detecting Hg^{2+} or monomethyl mercury.

41. The device of claim 31 further comprising a substrate on which the biostructure is disposed.

42. The device of claim 41 wherein the substrate is capable of detecting the signal.

43. The device of claim 42 wherein the substrate is a photosensitive film or a light-sensitive electronic chip.

44. The device of claim 41 wherein the substrate supports the biological material but does not detect the signal.

45. The device of claim 31 which is incorporated into a housing that is capable of penetrating a solid sample.

46. The device of claim 45 wherein the sample is mammalian, avian, or fish tissue.

47. The device of claim 31 which is capable of quantitatively measuring the amount of a metal in a sample.

48. A method of determining the presence of an analyte in a sample, the method comprises contacting the sample with the device of claim 1, wherein, upon contact with the analyte, the biological material produces a response and emits a signal; and detecting the signal.

49. A method of determining the presence of an analyte in a sample, the method comprises contacting the sample with the device of claim 31, wherein, upon contact with the analyte, the biological material produces a response and emits a signal; and detecting the signal.